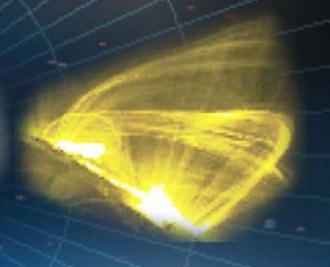
BEYOND EINSTEIN: From the Big Bang to Black Holes

Constellation-X

The Constellation X-Ray Mission



Project Update

Presented by
Jean Grady (GSFC)

Facility Science Team Meeting (FST)
December 18 – 20, 2006/Goddard Space Flight Center

Highlights Since Last FST Meeting (February 2006)

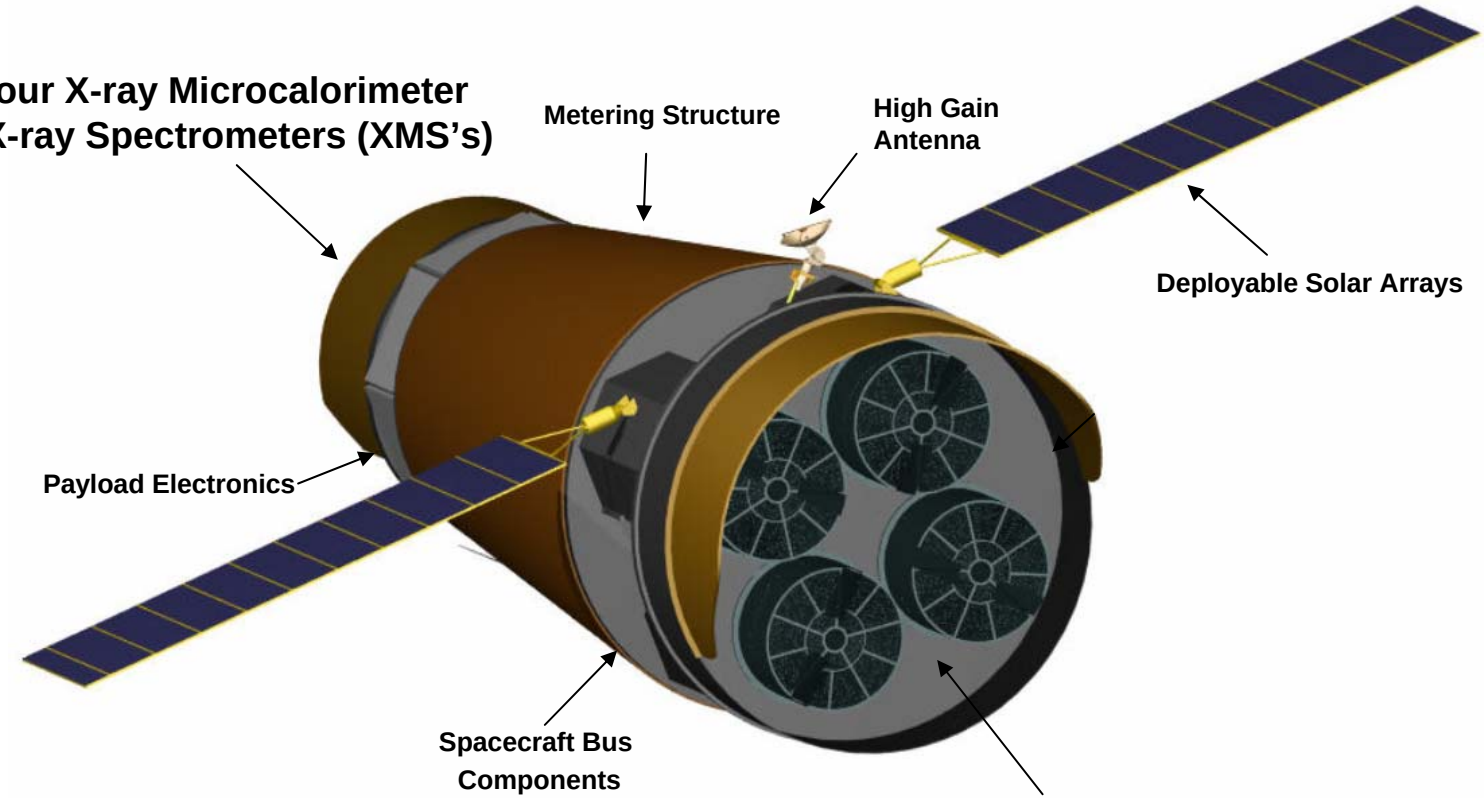
- Re-plan of FY07 due to mid-year budget cut – February/March 2006
- Wrapped-up single launch Delta IV mission configuration study – March 2006
- Study of single launch Atlas V mission configuration, in response to tightly constrained budget environment
  - Robust configuration
  - Substantial cost savings
- Request for Information for Science Enhancement Package (SEP) concepts
- Supporting National Research Council's (NRC) Beyond Einstein Program Assessment Committee (BEPAC) review
- Updating mission schedules and cost estimates

Single Launch Atlas V Mission Configuration Studies

- **Single launch Atlas V mission concept payload**
  - **SXT Flight Mirror Assemblies (FMA's) with X-ray Microcalorimeter Spectrometers (XMS's) at each focus provides required performance over 0.6 to 10 keV band pass**
  - **Science Enhancement Package (SEP) provides required performance below 0.6 keV and above 10 keV**
- **Activities to date:**
  - **SAO performed feasibility studies; mirror performance and launch envelope (mass and volume) – April thru July 2006**
  - **Trade of 3 vs 4 SXT (FMA plus XMS) and selected four SXT's for further study, based on superior response at 6 keV – August to October 2006**
  - **Request for Information (RFI) for SEP concepts – October to November**
  - **Flight Mirror Assembly configuration updated for smaller diameter (from 1.6 m to 1.3m) – October to December 2006**
  - **Completed initial definition of the observatory in GSFC's Integrated Mission Design Center (IMDC) - December 2006**

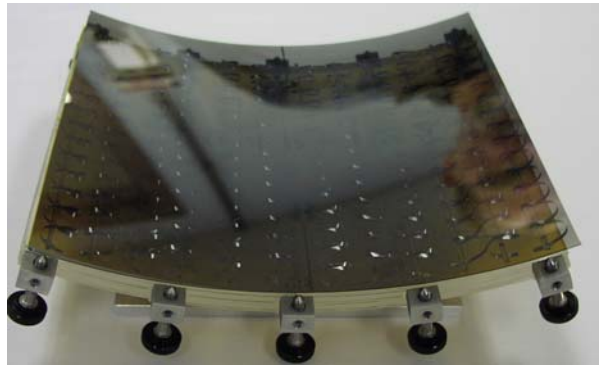
Constellation-X Atlas V Single Launch Observatory

Atlas V - 551



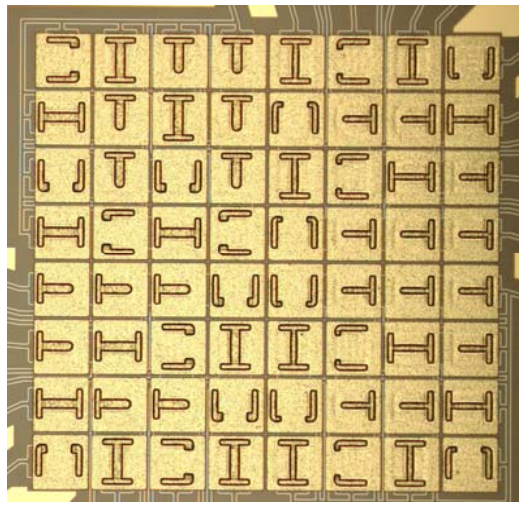
Mirror and Microcalorimeter Technology Progress

- **SXT Mirror Technology**
  - Figure of mirror segments improve overall
  - Metrology and "mattress" mirror mount have enabled new measurement and subsequent fabrication process improvement
  - Two methods of mirror mounting and alignment in development



Mirror Segment On "mattress"

- **Transition Edge Sensor (TES) Microcalorimeter Technology**
  - Good progress with gold absorbers (previously bismuth)
  - Producing devices with resolution < 3eV at 6 keV
  - Fabricated and tested full 128-pixel multiplexer system.



8x8 TES array

DRAFT Con-X Mission Schedule (assuming Con-X first to go …)

- **SXT Flight Mirror Assembly (FMA)**
  - FMA Industry Study: April to October 2008
  - SXT FMA award: March 2010
  - Final FMA Delivered: November 2015
- **Instruments**
  - AO Release: May 2008
  - AO Awards: May 2009
  - Final Instrument Delivered: August 2015
- **Observatory**
  - Observatory Industry Phase A studies: March to November 2009
  - Observatory Award: November 2010
  - Mission PDR: November 2011
  - Mission CDR: November 2012
  - Ship Observatory: August 2016
  - Schedule Contingency: ~6 months minimum
  - Launch: May 2017

Future Plans

- **Near term priorities focus on support for NRC BEPAC Review**

- **Next several months**
  - **Continue mirror and microcalorimeter technology development**
  - **Assess accommodation and other implications of SEP options**
  - **Complete draft Science Requirements Document**